DOCUMENT RESUME

ED 325 633 CE 056 136

AUTHOR Holmberg, Borje
TITLE Perspectives of Research on Distance Education. 2nd Updated and Expanded Edition.
INSTITUTION FernUniversitat, Hagen (West Germany). Zentrales Inst. fur Fernstudienforschung Arbeitsbereich.
PUB DATE Jun 90
NOTE 40p.
PUB TYPE Information Analyses (070)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Adult Education; *Curriculum Development; *Distance Education; Educational Administration; Educational History; *Educational Research; Educational Theories; Foreign Countries; Research Methodology; *Student Characteristics; *Teacher Student Relationship

ABSTRACT

This paper is an updated overview of distance education research and a survey of some important trends in the history of this research. It examines first the concept of distance education and the types of data available about students of distance education. Studies that have researched reasons for the choice of distance study are highlighted. Research on student types that best suit distance education is also reviewed. The next section focuses on the thorough research into the two constituent elements of teaching and learning in distance education: the presentation of learning matter in preproduced courses and the communication between the supporting organization (its tutors and/or counselors) and its students. A brief overview of research on the administration of distance education considers various forms of organization. Studies of supervised distance education are addressed as a special application. Other research areas touched upon include course and systems evaluation, theoretical approaches to distance education, the history of distance education research, and methods applicable to research into distance education. (Twenty-six pages of references are appended.) (YLB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED325633

FernUniversität
Gesamthochschule

Perspectives of research on distance education

2nd updated and expanded edition

Börje Holmberg

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☐ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Zentrales Institut für Fernstudienforschung (ZIFF)

Hagen, June 1990

CE056136

Summary

This is an updated overview of distance-education research as it appears in 1990 and a survey of some important trends in the history of this research. Although a fairly new field of scholarly study it has caused a great many investigations. There is good reason now to consider this area of study a separate discipline although many of its parts can be attributed to long-established, well-defined research fields.

Zusammenfassung

Dieses Papier bietet eine 1990 aktualisierte Übersicht der Fernstudienforschung und einen Überblick über einige wichtige Trends in der Geschichte dieser Forschung. Obwohl es sich hierbei um ein recht neues Forschungsfeld handelt, liegt bereits eine große Auswahl wissenschaftlicher Untersuchungen vor. Heute ist es deshalb durchaus begründet, dieses Forschungsgebiet als eigenständige Disziplin anzusehen, wenngleich viele seiner Teilbereiche auch anderen, längst etablierten Disziplinen zugeordnet werden können.

Zentrales Institut für Fernstudienforschung (ZIFF)
FERNUNIVERSITÄT - Gesamthochschule
Postfach 940
D-5800 Hagen

© 1990 FernUniversität - Gesamthochschule -

CONTENTS Page

Research as catering to the needs of theoreticians and practitioners 1

1 The concept of distance education 1

2 Student bodies 2

3 Teaching and learning in a restricted sense 6

3.1 Course development 6

3.2 Two-way communication 10

4 Administering distance education 13

5 Special applications of distance education 14

6 Course and systems evaluation 15

7 Theoretical approaches to distance education 16

8 On the history of distance-education research 17

9 Methods applicable to research into distance education 18

10 A discipline of distance education 19

References 21

Research as catering to the needs of theoreticians and practitioners

The conditions, methods and processes of distance education can - like other objects of study - be seen from different viewpoints. To the distance-education practitioner those aspects come to the fore that are relevant to facilitating and optimising teaching and learning. To the scholar concerned with distance education it is on the one hand the understanding of its character and applicability, on the other hand the explanations of its processes that are important.

Fortunately these concerns of the practitioner and the theoretician converge. The latter's aim 'is to find explanatory theories (if possible, true explanatory theories); that is to say, theories which describe certain structural properties of the world, and which permit us to deduce, with the help of initial conditions, the effects to be explained' (Popper 1980 p. 61). This means, as the philosopher quoted says elsewhere, that the task of scholarship is on the one hand theoretical, to bring about explanation, on the other hand practical, to provide for application or technology (Popper 1972 p. 49). Application, whether seen as consideration of target groups and study goals, methodology or administration, media selection or technology, or some other aspect of practice is, of course, exactly what the practitioner is primarily interested in.

The epistemological concerns of distance-education research has so far been given little attention; this topic is discussed in Minnis 1985, Evans & Nation 1987, Inglis 1988 and Holmberg 1990, however, and is at least touched on in Harris 1987.

Research into distance education of theoretical and practical importance includes knowledge acquisition as to the identification of students, their circumstances, needs and wishes, the study process, the courses used, the effectiveness and economics of the teaching and learning, as well as the general relevance to individuals and to society. Insight into the potentials of distance education for individual learning and various degrees of student autonomy as well as, paradoxically, mass communication is a ubiquitous concern.

We shall look into this research, but let us first give some attention to its basis and delineate our research area.

1 The concept of distance education

The term distance education covers the various forms of teaching and learning at all levels which are not under the continuous, immediate supervision of tutors present with their students in lecture rooms or on the same premises, but which, nevertheless, benefit from the planning, guidance and

tuition[1] of the staff of a tutorial organisation. Its main characteristic is that it relies on non-contiguous, i.e. mediated communication. Distance study denotes the activity of the students, distance teaching that of the tutorial organisation.

There are evidently two chief partners in the teaching-learning process, i.e. the student and the distance-teaching organisation with its tutors, counsellors and administrators. Following Delling I refer to this organisation, be it a school, a university, an association or a company, as the supporting organisation.

The understanding and the very concept of distance education has been made the subject of scholarly debate, thus in Bååth 1981, Barker, Frisbie & Patrick 1989, Delling 1966 and 1987, Garrison 1989, Garrison & Shale 1987, Holmberg 1977 and 1989f, Keegan 1980 and 1990, Ljoså 1988, Rumble 1989a and b, Shale 1988 and 1989 and elsewhere. Part of this debate is concerned with the role of face-to-face interaction as a supplementary or integrating element and part of it with the changes brought about by modern media. The possible convergence with traditional education is another case in point, to which attention is given particularly in Australia. Cf. Smith & Kelly 1987. Shale 1989 in stressing this convergence with the 'mainstream' of education, refers to a 'paradigmatic shift' evidently because of the influence of information and communication technology, but keeps within the definition given above in that he describes non-contiguous communication as the main characteristic of distance education.

In the British usage of the late 1980s the term *open learning* is often used in the sense of distance education as described above (cf. Thorpe 1987, who explicitly testifies to this change of meaning). This seems to be a regrettable development from the point of view of conceptual clarity. Open learning really refers to open access and openness 'with respect to place, time, content of learning, mode of learning, etc.' (Dewal 1986 p. 8) and need not rely on non-contiguous communication. Cf. van den Boom & Schlusmans 1989, Cunningham 1987, Foks 1987, Holmberg 1989a and b, Paine 1988 and Rumble 1989a.

2 Student bodies

Distance-teaching institutions in different parts of the world have collected a great number of data about their students, their age, sex, family, occupations, study time available, study milieu and conditions of study, prior knowledge, aims etc. (McIntosh, Calder & Swift 1976, Ansere 1978, Flinck 1980, Wångdahl 1980 etc.). Data concerning degrees, examinations, marks, drop-out and other information about study results have been registered everywhere. Cf. Graff & Holmberg 1988.

1) The word 'tuition' is used in its British sense, meaning 'tutoring, teaching'; here it has nothing to do with fees as it would have in American usage.

There is evidence to indicate that distance students cannot be regarded as a homogeneous group. The only common factor is that, with few exceptions, these students are adults and consequently as a rule are gainfully employed and/or are housewives. The age group 25 to 35 seems to be the largest one in most systems. The Australian University of New England reports that the average age of their distant students was, in 1979, 34 years; 73.1 per cent of the students of the Spanish Universidad Nacional de Educación a Distancia are over 26, whereas correspondence students in Brazil taking courses at lower secondary level are usually 15 to 20-year-old male workers. Although in some countries (Norway and Sweden are typical examples) distance study is an almost universially recognized study form, with male and female students in all social strata, in other countries (West Germany, for instance) it is mainly seen as a second chance for people previously unable to acquire a formal education. Distance study evidently contributes to social mobility. It did so in Sweden during the first half of this century and afterwards, and it does so in the UK at present.

The gigantic student bodies of the Chinese TV universities deserve special mention. In 1989 some 650 000 degree students were registered with these universities, which can already record more than a million graduates and another two million students who have completed non-degree programmes. This is the more impressive as after a start in 1960 the universities were closed down for ten years during the so-called cultural revolution (Xie 1989). The student bodies consist of both mature men and women 'delegated' by their employers to study full time or part time (without any salary reduction) and of youngsters studying at a distance as a result of conventional universities being overburdened. Cf. Hawkridge & McCormick 1983 and Zhao 1988.

American and British studies indicate that 'correspondence students' to a greater extent than other adult students have examinations and degrees as their aims. On the other hand, considerable numbers of them have declared, in different contexts, that they study purely for academic interest.

McIntosh, Calder & Swift 1976 and Glatter & Wedell 1971 have shed some light on the reasons why students have chosen distance study instead of other types of adult education. The replies to a questionnaire sent to 20 000 students and answered by some 12 000 showed, according to Glatter & Wedell, that more than 70 per cent chose correspondence study because it was felt better than other study forms to facilitate the planning of the study programme chosen and to assess the progress made. The time factor came next as a reason given for the choice of study. More then 50 per cent answered that they had chosen correspondence study because it makes 'it easier for you to work at your own pace than if you went to classes'. Almost the same percentage regarded going to classes as 'uneconomical of time'. More than a third of the respondents stated that they preferred studying on their own 'to studying in a class with other people'.

Of the reasons given by students for studying with the Open University, it was found that 'those stressing ends predominated over those stressing means' (McIntosh, Calder & Swift 1976 p. 245). The younger students stressed educational qualifications and jobs, whereas reference to the general widening of knowledge increased with age.

Flinck's study shows that the three most important reasons why the students investigated had chosen correspondence education were:

- The freedom offered to pace their study as they wanted to (83 per cent)
- The support provided in planning the study and assessing progress (in relation to completely unaided study) (73 per cent)
- A predilection for individual work: 'I like working by myself' (63 per cent)

(Flinck 1980 pp. 6 - 9)

Distant students' views of themselves is of great interest in this context. An investigation of these has been made by Göttert 1983, who reports on an interview study of more than 500 FernUniversität prospective and real students. These 'saw themselves as more competitive, achievement oriented and assertive' than the average general population and student groups investigated. 'Only small differences were found between dropouts and persisters (after one year in distant study): the persisters (before enrolment) had portrayed themselves as more competent and successful in coping with academic and social demands ...' (Göttert 1983, Summary before the list of contents).

These are results illuminating the situation in countries where there is a real choice between study opportunities. When the traditional educational facilities of a country are overburdened, students may enrol for distance-education programmes because they represent the only possibility open to them. Realising this must not stand in the way of the insight that to many adults in various parts of the world distance education is the preferred mode of study as it allows entirely private and individual learning, requires no classroom attendance and can make study independent of time and place.

Attempts have been made to find out what types of students distance education suits best and who is most apt to benefit from distance education. So far we are hardly in a situation to give anything like a definite reply. However, some intimations are possible. From three German studies can be concluded

* that the agreement between personal interest and course offer (degree structure) is the most decisive factor for success (continuation of study) and failure (drop-out) (Bartels 1982 p. 11, Bartels 1983 p. 16)

* that students inclined to work on their own rather than collectively, i.e. those who do not feel any handicap of isolation, but rely on their own initiatives to establish contacts when desired, tend to be successful (Bartels 1982 p. 18), whereas most drop-outs suffer from learning in isolation (Bartels 1983 p. 24 - 25)

* that a certain amount of resignation concerning the chances of professional promotion is common among the drop-outs (Bartels 1983 p. 7)

* that most of the students investigated, whether successful or not, are on the whole satisfied with the courses and student service provided, although some are explicitly critical of the pacing imposed on them, poor-quality tutor comments, slow turn-round time for submission assignments and administrative snags (Bartels 1982 pp. 34 - 35; Bartels 1983 pp. 30 - 32, 35 - 36)

* that the drop-outs have 'greater problems co-ordinating the requirements of their jobs, families and study than those continuing their study and are less capable of substaining heavy workloads and changes in job situations; the latter are more prepared to accept that their personal life suffers during their time of study' (Bartels, Helms, Rossié & Schormann 1984 p. 94).

Apart from the last characteristic, which is concerned with physical and mental strength, and, partly, the general satisfaction with the study facilities, this summary indicates the dependence of success on strong study motivation generally and motivation for distance study in particular.

A study by Rekkedal indicates on the basis of statistical evidence

* that practically no relationship could be established between students' domestic background and discontinuance (Rekkedal 1972 p. 17); this is remarkable as distant students generally stress the importance of encouraging support from husband/wife and other family members (cf. Bartels 1982 p. 14 and 1983 p. 20 confirming this)

* that older students 'survived' to a greater extent and achieved better results than younger students (ibidem p. 26), which, as far as the first statement is concerned, agrees with Donehower's study of 1968; as to the second statement Donehower

> '.. found that the oldest group (only 9 students more than 60 years old) received the lowest marks. Except for these oldest students, the achievement rose with increasing age of group, at least up to about 45 years of age'
>
> (Rekkedal 1972 p. 26).

* that, not unexpectedly, there were positive correlations between the levels of previous education and both survival and achievement, which agrees with findings at The Open University (McIntosh, Woodley & Morrison 1980 pp. 54 - 55).

Even though, thus, age and previous education are important, the one single factor that is typical of the successful distant student is personal motivation. Cf. Sewart 1983 p. 168. Masson 1987 favours, on the basis of reflections on Jungian typology, the hypothesis that distance education is more appropriate for students of the introvert type than for extroverts. So far this hypothesis has not been tested empirically.

How many students drop out and why they do so are problems engaging many scholars (Bååth 1984, Peters 1988, e.g.).

Students' learning styles, particularly as analysed by Marton and his Gothenburg group (Marton 1975, 1979 and 1983, Marton & Säljö 1976), have caused a number of attempts to influence course development. See further Pask 1976a and b, Coggins 1988 and Howard 1985, e.g.

Many adults prefer distance study to other forms of learning because they feel it makes them more independent. This is undoubtedly (in most cases) a reality as far as timing is concerned. The question is whether distance education is or can become a method for acquiring knowledge and skills on conditions determined by students, and thus be a method suitable for autonomous students. Cf. Moore 1972. Thorough studies of autonomy-expecting and autonomy-supporting distance education have been made by Monika Weingartz, to some extent within the framework of a FernUniversität international investigation (Weingartz 1988 and 1990).

3 Teaching and learning in a restricted sense

There are two constituent elements of teaching and learning in distance education. One is the presentation of learning matter in pre-produced courses; the other is the communication between the supporting organisation (its tutors and/or counsellors) and its students. The former, which can be labelled course development, is concerned with the creation and production of learning material for the message of the supporting organisation to the students, i.e. with one-way traffic between the supporting organisation and the students. Both have been subjected to thorough research.

3.1 Course development

It is probably true to say that the greatest number of research studies within the field of distance education have concentrated on course development, its requirements, its use of communicable, more or less behaviourist objectives, selection and structuring of contents, the choice and use of

media, language and style and similar matters. Here it has been possible to draw on research on written presentations generally, use of radio and TV, audio and video recordings, information technology, illustration techniques etc. The Open University seems to have contributed a particularly great number of studies specifically relevant to the development of distance-education materials (Bates 1984, Macdonald-Ross 1973, 1977 and 1979, Waller 1980, e.g.).

Several distance educators have concerned themselves with various general approaches, like behaviourism, cognitive psychology, discovery learning, cybernetic theory, aptitude-treatment interaction, subsuming and 'meaningful verbal learning' in Ausubel's sense etc. Possibilities to individualise teaching also when preproduced courses are used, i.e. allowing students to choose their own objectives as far as this is possible, have been subjected to some important studies (Ljoså & Sandvold 1976 e.g.). Pluralistic approaches implying the use of literature chosen at least to some extent at students' discretion with the help of study guides orienting them in the subjects and sources concerned have been studied in a scholarly way by some distance-education researchers (Lehner & Weingartz 1981 and 1985, e.g.). Approaches of this kind tend to direct attention to so-called contract learning and its application in distance education (Worth 1982, Weingartz 1990).

The use of study guides is to be compared with that of self-contained courses which, in principle, provide all the teaching required and are usually preferred at elementary levels. They appear less suitable when conflicting approaches are to be presented. Cf. Holmberg 1989a p. 66. Here study guides to recommended reading are usually preferred. In a study of their use Du Plessis underlines that

> study guide design should afford individual students the opportunity of developing their own learning styles. Once they have identified the teaching objectives, they should find, and be able to use, multiple access points to the subject matter. The study guide should enable students to keep to the order of presentation if they wish, or to select areas they consider relevant, skip material they have already encountered and do not wish to repeat, or evaluate themselves on any section where they wish to ascertain their standing, even if they do this before studying the relevant part in any great detail. It follows that study guides can hardly be 'too easy' in this regard. They should, however, provide a measure of 'difficult' work as well by, for example, inserting appropriate self-evaluation questions that challenge even the best of students.
>
> (du Plessis 1987, 13)

Study guides should, preferably, in the interest of plurality, encourage students to use a number of different sources. This usually necessitates the availability of library services. A second best is the use of specially prepared readers which contain contributions representing different approaches. This practice evidently tends not to diminish interest in library facilities. On the basis of research by

Winter and Cameron, Jevons states:

> Where books of readings are supplied as well as study guides, students make more use of almost every other source of library material or information than do students who do not get readers. Their appetite is whetted rather than satiated.
>
> (Jevons 1984, 32)

Interest in promoting students' independence is great among distance educators . On the basis of an international study of some 200 distance-teaching organisations I could report as follows in 1988: 'A clear correlation between success rates and approaches favouring student independence was found. These approaches include individual (free) pacing of the study as to assignment submission, the possibility for students to influence the study content and encouraging querying attitudes among them. A maybe somewhat surprising finding is that the majority of the organisations studied do not pace their students but allow them to submit assignments when it suits their individual time-tables. This seems to be a tangible sign of belief in the value of student independence' (Graff & Holmberg 1988 p. 90).

Distance educators have developed techniques to direct students' attention to important issues, to considering and searching for solutions. Various designs are used to help students to structure their learning. Apart from graphical methods such as headings, graphs and change of type a number of pedagogical pointers are used. Here belong attention-directors of various kinds. Those which are most typical of distance-study courses are suggestions to note or review something and self-checking exercises. Assignments for submission can also have this function. Ausubel's 'advance organisers' and Rothkopf's inserted questions are also of common occurrence (Ausubel 1968 pp. 148 and 137, Rothkopf 1966 and 1970).

A Venezuelan study by Anne Benkö de Rotaeche of different versions of the same distance-teaching course is of particular interest here as it looks into the basic questions whether instructional design in this sense actually exerts a positive influence on learning effectiveness or not. On the basis of careful empirical investigations of a small student sample the author concludes that her analysis 'supports numerous studies that have demonstrated the importance of instructional aids' (Benkö de Rotaeche 1987 p. 67). Her study shows that 'different versions stimulated different learning activities and that higher achievements were attained when the instructional aids were taken into account. It was also found that instructional design was able to stimulate a higher level of processing' (ibidem p. vii).

Other scholars are more reserved in their attitude to attention-directors and similar aids used in educational design. This would seem to apply to Weingartz 1980 and 1981, who considers formal text criteria fairly insignificant in relation to the basic text design, which may start out from

problems to be solved and thus support problem learning, or may simply present ready-made systems of knowledge for reproductive learning, and even more to Marton, who fears that all kinds of attention-directors may avert students' interest from the content to the technical aspects of the reading process, thus encouraging surface learning and leading to neglect of deep structure.

Among a great number of contributions to knowledge about media and their potentials Bates 1984 stands out. It is a book containing articles on, inter alia, text and word processors, TV and radio, audio and video recordings, viewdata (videotex), telephone and computer teaching. A presentation concentrating more on technical aspects is Winders 1988.

Dangers connected with the use of modern technology have been discussed by some scholars. Thus an article by Stephen Fox is a reminder to distance educators and educational technologists of modern trends which can lead to education being regarded merely as information transfer. Fox fears that 'the current proliferation of new technology is replacing the agency of human speculation with a kind of impersonal, disembodied, free-floating, public dissemination of information' (Fox 1989 p. 269) and that 'just as humanism gradually sapped the divine element in the nature of knowledge, the current post-modernism is sapping the human element' (ibidem p. 27). Criticism of educational technology from a different viewpoint, that of the so-called critical theory, occurs in Harris 1987.

There can be little doubt that Fox has reason for his warning, but a fact that should be mentioned is that there is among many distance educators a strong commitment to liberal education in the humanist tradition. This commitment fortunately goes further than the 'rhetoric' which Fox rightly finds 'at the very least, ambiguous' (p. 275). That this is so is illuminated by the current discussion about the applicability of self-contained courses, about which I have said elsewhere that they 'can easily become autocratic, telling students not only what to do but what conclusions are the proper ones, thus depriving them of the exercise of their own criticism and judgement' (Holmberg 1989a p. 13). More tangible evidence of this commitment occurs in the very practice of more academic types of distance education - from a strictly structured study of set texts representing different and even contrasting views to project work and so-called contract learning as well as R & D initiatives safe-guarding far-reaching student autonomy (Holmberg 1989a pp. 65 - 68 and 154 - 160, Elton, Oliver & Wray 1986, Ljoså & Sandvold 1976).

Kathleen Forsythe directs educators' attention to the 'generative' and 'degenerative' effects that a medium may have:

> A degenerative effect would be one that inhibited conversation. This could be effected by stifling the imagination or isolating the participant from conversation.
>
> (Forsythe 1986 p. 23)

She refers to criticism of television in this context and underlines the necessity to choose and use media in a way that encourages creativity and to avoid 'feedback information in closed loops' (p. 24). This is particularly relevant to the use of computer technology which often causes programming in advance, which Forsythe rejects as negative to 'the variety so necessary for learning' (ibidem).

While warnings of the type mentioned are highly relevant, the potential of modern technology is evidently considerable and has not yet been either exhausted or sufficiently investigated. Can, for example, so-called hypermedia systems enable tutors and learners to create their own paths 'through a corpus of related material' (Hall et al 1989 p. 210), which would make for liberal education? It is evident, though, that there are a number of obstacles to implementing new technology in distance education (cf. Laaser 1988).

However, the medium primarily used for one-way traffic, i.e. for the presentation of learning matter is and will undoubtedly remain print. It is also the by far most frequently mentioned medium in a FernUniversität international study based on questionnaire replies (Doerfert & See-Bögehold 1988 p. 47).

Beside a number of studies of specific measures and media there has also been some search for overarching principles in course development. I have made some attempts in this direction by my theory of guided didactic conversation and my empathy approach implying that teaching and learning are a communication process resembling conversation. The pre-produced courses which cater for one-way traffic are then taken to represent simulated communication whereas real communication occurs in distance education through mediated interaction between students and the supporting organisation (Holmberg, Schuemer & Obermeier 1982). Research contributions pointing in the same direction have been made by Pask 1976a and b, Thomas & Harry-Augstein 1977, Forsythe 1986, Juler 1989 and others.

3.2 Two-way communication

Distant students do not learn only from course materials, but also from interaction with tutors (and others representing the supporting organisation). As they are at a distance from their organisation, this interaction is mediated and occurs in the form of written correspondence, telephone conversations, computer communication or other means which allow non-contiguous communication. Written correspondence and telephone interaction are the most common types of mediated communication (Schuemer 1988a p. 55). Usually this interaction is chiefly based on assignments for submission attached to pre-produced course units. An enlightening discussion of principles for designing feed-back situations in distance education based on modern literature on instructional design occurs in Howard 1987.

To this two-way communication have, as shown in a comprehensive research report by Bååth 1980, been attributed a number of functions. The most important of these are 'to encourage, to correct errors, to signal difficulties on the part of the learner, to inform those who prepare educational materials, and to allow learner and teacher to take off in directions which had not been foreseen. This last capacity is, for many educators, of unique value and importance, lying at the heart of the educational process if it is to be worthy of the name' (Perraton 1987 p. 5).

The role of this real communication varies. In some systems it merely has a supporting function whereas the course materials provide most of the teaching (in the form of one-way traffic). The practice of the FernUniversität is a case in point. In other cases two-way traffic is at the core of the teaching-learning process. This can be done by assignments being given which induce students to relate the general presentation of the course to their own particular concerns and experiences, as described by Elton, Oliver & Wray 1986, for example.

Projects for advanced individual investigations also have to rely on personal supervision and guidance being constantly available (cf. Bynner 1986), and even greater demands on real person-to-person communication are raised by systems which provide no or little pre-produced learning material but offer individual support of the study of set texts by correspondence or telephone. This is what occurs in some study for London University degrees. This university has, in fact, since 1836 conferred degrees on students who have not attended any of its classes (Tight 1987). Individual tutoring can be based on the study of literature prescribed or agreed between the professor and the individual students. Recent developments along this line have occurred in the contract learning initiated in the USA by Empire State College, NY (cf. Coughlan 1980, Worth 1982), in a diploma curriculumn at the North East London Polytechnic (Bradbury et al. 1982, Hinds 1987), and at Murdoch University in Western Australia (Marshall 1984). The individual student exerts strong influence on the objectives of his/her study. In these cases, distance education is characterised by adaptability to students' needs and wishes, not only as far as time and methods are concerned. These are applications of far-reaching student independence at all levels.

Communication in distance education is a research area to which many contributions have been made and more are to be expected. The possible impact of the communication frequency, i.e. how often in relation to the amount of learning matter students are invited to submit assignment for correction and comment, has been carefully studied by Bååth 1980, whose study was replicated by Holmberg & Schuemer 1988 and 1989. In spite of the plausibility of the assumption that frequent communication promotes learning neither of these studies have resulted in any statistically significant support of it. A discussion of the problem on the basis of empirical research occurs in Holmberg 1989e, which contains contributions also by Bååth, Diehl and Rekkedal as well as the Holmberg & Schuemer study mentioned. Cf. also Thompson & Castro 1988.

The importance of short turn-round times (from students sending an assignment to the supporting organisation until the assignment has been returned with the tutors' corrections and comments) has been seriously looked into by Rekkedal 1983, Barker et al 1986 and Diehl 1982 and 1989. While Rekkedal's study showed that completion rates correlated with turn-round time, a statistically significant finding, Diehl has come to a different conclusion and Barker et al. only partly confirm Rekkedal's findings. There is uncertainty about what in different contexts constitutes delayed feedback and about the interaction of the time element with other factors. This is discussed in Holmberg 1989e. There is no doubt, however, that delayed communication can be a great weakness of normal distance education. The possibility to use micro-computers, modems and telephone communication, so-called electronic mail, to attain immediate reception both of students' assignment papers etc. and of tutors' corrections and comments will undoubtedly bring about considerable improvement as soon as the cost for equipment can be afforded by students and organisations. The organisational and technical developments in this respect will be an important research topic. Cf. Scriven 1988, Mason & Kaye 1989.

A number of further investigations of mediated communication as carried out by other media than the written word have been made, thus e.g. telephone interaction by Flinck 1978, Robinson 1984 and others, computerised communication by Bacsish 1984, Bååth & Månsson 1977, Lampikoski 1984, Jones 1984, O'Shea 1984, Mason & Kaye 1989 etc. A survey of research and practical applications of communication in distance education occurs on pp. 92 - 116 of Holmberg 1989a.

The attempts to identify overarching principles mentioned under 3.1 are relevant also to the two-way communication in distance education. The empathy concept has, not unexpectedly, been found to apply as much to the interaction between students and the supporting organisation as to course development. A 1985 investigation by Rekkedal, which sheds light on the communication process, demonstrates this.

Communication based on assignments can be merely matter-of-fact without any really personal element. Many distance educators consider such impersonal correction and commenting a waste of valuable opportunities. If personal rapport is established, students are likely to enjoy the learning more and to be more succesful than otherwise.

Rekkedal's study is relevant in this context. It tests a 'new' tutor role which integrates 'the functions of administrative measures, tuition and counselling' (Rekkedal 1985 p. 35). Each student in Rekkedal's experimental group was given one contact person in the distance-teaching organisation. This contact person was the student's tutor, counsellor and administrator answering questions about all matters connected with the study. Rekkedal investigated the outcome of this integration of supporting tasks, which included introductory letters in which the contact persons introduced themselves to their students, short turn-round times for assignments and frequent telephone contacts with students. The study comprised a comparison between an experimental

group offered these services by a personal tutor-counsellor while studying 3 - 11 courses of a course combination leading to a professional qualification and a control group following the usual pattern of the school concerned (NKI in Oslo).

> The main difference between the treatment of the experimental group and the control group was that the experimental students communicated with one personal tutor integrating administrative, teaching and counselling functions, which normally are separated (Rekkedal 1985 p. 9).

Statistically significant differences were found between the two groups. 'The students in the experimental group had a higher completion rate, they were more active in their studies and completed a larger number of study units and courses during the experimental period' (Rekkedal 1985 p. 13).

On counselling in distance education important studies have been made by, for instance, Sewart 1984 and Thornton & Mitchell 1978.

4 Administering distance education

The administration of distance education necessarily exerts strong influence on the teaching-learning process. The Rekkedal project just referred to illuminates the interrelationship between education per se and administration. The distribution of course materials (individually following each student's submission of assignments, periodically on fixed dates or the whole course at the beginning of the study) can mean much for students' possibilities to work independently. The same applies to pacing imposed on students by the supporting organisations. Such prescribed pacing is of common occurrence although it often creates avoidable problems and can lead to discontinuation (Bartels & Hofmann 1978). Whether or not to impose pacing is a bone of contention among distance educators. Cf. Daniel & Marquis 1979, Delling 1975 and Holmberg 1989a pp. 150 - 160.

Distance education is organised in very different ways depending on the general conditions of the supporting organisation. Extreme contrasts are the large-scale systems of the Open-University type and small-scale systems like the Australian University of New England. In the former there is considerable division of labour so that course developers create courses in large editions with often thousands of students per course, whereas a number of tutors, counsellors and administrative staff provide for student service. In the latter individual university lecturers develop distance-study courses for their own students only and also function as their tutors. Cf. Holmberg 1986a Chapter 2.1. There are also a number of further organisational approaches. In some studies the conditions referred to have caused a development of typologies of distance-teaching systems (Keegan 1990 Chapter 8, for example). A typological study by Schuemer 1988b is of

special interest as it consistently relies on the empirical data of some 200 distance-teaching organisations.

Organisational-administrative considerations of course development have led to a number of studies (Holmberg 1983, Kaufman 1982). Basically, as shown in these studies, two organisational approaches dominate. They are the course-team approach, which by division of the course development work among subject specialists, educational designers, illustrators, media specialists, etc., caters for first-class expertise on all aspects of the course being created, and the author-editor approach, which tries to unite subject expertise with educational design.

The course-team approach may lead to a de-personalised style of presentation contrary to the style of didactic conversation and may tend to support the presentation of learning matter as ready-made systems rather than as guides to problem-solving. Cf. Weingartz 1980 pp. 167 - 169. To what extent these effects occur or are avoidable is uncertain, although there are signs that few of the courses created by course teams are based on problem-solving approaches (Weingartz op.cit.).

The organisation and administration of distance education constitute an area of research to which a number of contributions have been made and more are needed. A comprehensive survey of what has been done so far with a number of original approaches is Rumble 1986. Further up-to-date contributions to this field are the relevant chapters in Kaye & Rumble 1981 and Henri & Kaye 1985. A study of the very system or systems of distance education is a concern of both theoretical and practical relevance. Ljosså 1975, including among other papers Erdos' classical 'System of distance education in terms of sub-systems and characteristic functions', bears witness to this. Data for further analyses have been made available in Doerfert, Schuemer & Tomaschewski 1989.

5 Special applications of distance education

While most applications of distance education apply to adult, further and higher education it also occurs under tutors' immediate supervision in schools for children and youngsters in sparsely inhabited areas or where there is a lack of qualified teachers. Usually one teacher/supervisor looks after a number of young people undertaking distance study of various subjects at varying levels. Supervised distance study also occurs as entirely individual study when isolated children are taught by distance methods at home, usually with one of the parents as supervisor. Most supervised distance study of the former kind is concerned with secondary education; Australia in particular has much experience of primary distance education of isolated children.

What has been said above about methods and media is largely applicable to supervised distance education. Although the term 'supervised correspondence study' may still be more common than

'supervised distance study', written communication seems to be less dominant here than in other types of distance education. This is mostly because of the face-to-face support inherent in this type. Further, for many years radio has been a most important communication means in primary education of this kind, both for one-way traffic and for two-way communication (cf. McGuire 1973 and Fitzpatrick 1982 on Australia's schools of the air). Electronic mail will, of course, be of great importance to supervised distance education of any kind. Taylor & Tomlinson hold that it could even 'signal a new approach to primary distance education' by involving 'the distance education teacher more closely with the isolated child' (Taylor & Tomlinson 1985 p. IV). See also Vivian 1986.

Much experience has been gained of supervised distance education and some of it has been duly documented. On work done in this area in Australia, see Rayner 1949, Taylor & Tomlinson 1985, Tomlinson, Coulter & Peacock 1985, in North America, see Childs 1953, Mitchell 1962, Woodley 1986, in Israel, see Weissbrot 1969, in Sweden, see Holmberg 1973. Cf. further Tesarowski 1984.

The principles of supervised distance education are applied also to the training of adults, for example in staff-development programmes, even in military contexts (Saxe 1965, Milanesi 1978, Elton, Oliver & Wray 1986). Some programmes of this kind have proved to be extremely cost effective (Staaf 1973; cf. Holmberg 1989 p. 138). The British so called Open-Tech, Open College and 'fleximode' approaches are of interest in this context. The term 'fleximode' refers to flexible arrangements not only for individual (often self-paced) learning based on pre-produced course materials but also for teacher-contact time and the use of resources (Ashhurst 1985). Administrative and financial concerns related to fleximode and its use of computers have been studied by Bowles 1987.

6 Course and systems evaluation

The type of evaluation which is not primarily concerned with assessing the achievements of students and awarding marks but rather with the estimation of distance courses and systems of distance education has attracted much attention. A useful approach to the evaluation of distance-education systems is presented in Rumble 1981. Formative evaluation in the form of developmental testing as part of course creation has been described and discussed by, among others, Henderson & Nathenson 1976 and Bartels & Wurster 1979 (the latter in German). The methodology of evaluation has been looked into (from a mainly technological point of view) in Chapter 4 of Holmberg 1989a and in a way critical of rationalisation approaches by Kemmis 1980; cf. also Evans & Nation 1989. The evaluation of distance education naturally largely relies on principles developed for educational evaluation generally. Scriven 1967 and Stake 1977 have been particularly influential. A most useful handbook for distance educators is Thorpe 1988, in which more attention is given to the evaluation of tuition and counselling than in other contributions known to me.

What most evaluation of distance education is concerned with are the effects on students' achievement and their attitudes to their courses, the supporting organisation and distance education generally. Studies of course completion and student drop out belong here. Important research in this area has been conducted by Bååth 1984, Rekkedal 1978, Peters 1988 and a number of other scholars.

Other kinds of evaluation are mainly focused on the economics of distance education, thus, e.g. Wagner 1977, Snowden & Daniel 1980 and Perraton 1982. Keegan 1990 summaries much of this research. There is fairly general agreement that distance education can offer considerable financial advantages

7 Theoretical approaches to distance education

The earliest and some latter-day attempts to develop theories of distance education are mainly concerned with the identification of its very character, thus Delling 1966 and 1987, Peters 1973, 1989 and Sewart 1981 and Keegan 1990.

The directions of research in this area so far followed vary. Whereas Bååth 1979 consistently relates the concerns of distance education to well-known general theories of teaching and learning, Moore 1973 and 1977 in developing his theoretical approach and discussing the distance concept distinguishes between dialogue and structure as important elements of distance. Peters 1973 (1983 and 1989) analyses distance education as an industrial form of teaching and learning and stresses rationalisation, division of labour, economies of scale and similar characteristics of distance-education organisations. Wedemeyer 1981 (and elsewhere) represents a liberal, humanistic, 'andragogical' approach. Kevin Smith 1983 should be mentioned as a protagonist of the dual-mode approach, which represents a kind of distance education which, as far as periods of study, examinations and general conditions are concerned, is a consistent parallel to on-campus study.

The search for a theory that can guide practical work is a complicated endeavour. Some empirical findings and theoretical deliberations of relevance have been presented by Bååth 1982.

For further work epistemological concerns must be considered, descriptive elements must be identified, explanatory and predictive potentials looked into when assumptions are made. It should be possible, at least to some extent, to express these assumptions as logico-deductive hypotheses (if A, then/then not B; or, the more/less A, the more/less B), which can be transformed into prescriptive rules. If such hypotheses are generated from a logically coherent but,

at the outset, possibly only implicit theory, the testing implies attempts to falsify or corroborate this theory.

Perraton 1981, basing his arguments on a view of education as connected with power and a base both for expanding education as an egalitarian requirement and for stressing the importance of dialogue, makes his contribution to a theory of distance education in the form of fourteen hypotheses or statements. He indicates a desire to find ways of testing his hypotheses. The present author has attemped a hypothetico-deductive theory based on the rapport and empathy concept. It has, as far as a theory of teaching for distance education is concerned, generated eleven testable (and, in fact, in part already tested) hypotheses, some of which resemble at least five of Perraton's hypotheses (Holmberg 1986a Chapter 8). Perraton 1987 and Holmberg 1989a look further into the possibilities for theory development in distance education.

The last-mentioned approaches differ from the other more descriptive theoretical considerations in that they represent search for predictive hypotheses. My own attempts in this direction are based on a view of theory as a set of hypotheses logically related to one another in explaining and predicting occurrences. Theories of this kind should, if they are general and inclusive enough, be helpful to practitioners by suggesting suitable methods and procedures.

Also theories of more limited scope are useful, thus, for example, the differentiating of intellectual skills introduced by Chang, Crombag, van der Drift & Moonen 1983. Skills to be learnt through distance study are divided into operations on knowledge and operations with knowledge. The latter imply application of knowledge acquired and are concerned with 'results in the exterior world, reality' (Chang, Crombag, van der Drift & Moonen 1983 p. 15). 'Operations on knowledge (critique may be a good example) apply to coded knowledge and result in new or new representations of knowledge, and in the skill of producing new forms of knowledge out of existing knowledge' (op.cit. p. 14). Distance educators following this approach have to judge where these two types of operation are required and for each procedure and each medium to decide to what extent it helps students to acquire the operational capacities concerned. Attempts theoretically to approach distance education from sociological starting-points have also been made, thus by Harris 1987.

8 On the history of distance-education research

Distance education is nothing new. There are documents indicating that it was practised as early as the beginning of the eighteenth century. We know for certain that it existed in the early nineteenth century (Holmberg 1986a pp. 6 - 7). Scholarly interest and research in distance education is of fairly late date, however.

With few exceptions (like Feig 1932 and Bittner & Mallory 1933) studies testifying to interest in research in the area did not appear until after the second world war, however, and the earliest monographs date from the 1960s (Holmberg 1960 and 1967, Wedemeyer & Childs 1961, Sommer 1965, Dohmen 1967, Erdos 1967, Peters 1965 and 1967). The sixties also saw a number of articles and occasional papers with seminal ideas. Delling 1966, Rosberg 1966, Sims 1966 and Wedemeyer 1965 should be mentioned here. The first bibliographies of distance- education writings also appeared in the 1960s (Childs 1960, Bibliographie Fernstudium 1966 and Holmberg 1968).

Like most educational research, studies of distance education were from the beginning based both on intellectual inquisitiveness generally and on practical requirements implying, among other things, a desire to know as a result of feelings of social and educational responsibility among practitioners. During the 1970s and 1980s, when distance-education research seems to have become of age, it is from the distance-teaching organisations that most research studies emanate. Not unexpectedly scholars at the big distance universities and the Australian, Canadian and US 'dual-mode' universities have made a number of contributions, and so have recently Latin-American scholars (like Miguel Casas, for example). Studies carried out at the planning stage in anticipation of the needs of new distance-teaching organisations have in some cases been of high scholarly standard of general interest to the field (Chang et al. and Köymen 1983, inter alia).

Sometimes research initiated by organisations practically concerned with distance education seems to have had as its incentive a management/administrative background rather than wishes to serve attainable student bodies or theoretical considerations. A kind of meta study is often found desirable as a means to study the organisation (university etc.) itself, which can lead to the research organisation becoming a kind of auditing body checking how resources are used etc. If it is then attached to a decision-making authority, its search for knowledge may be limited to purely instrumental concerns and it may be hampered by loyality to institutions rather than to scholarship per se. Entirely free research performed within the framework of an independent institute with resources of its own is more likely to include fundamentally critical issues of more than an ephemeral character.

9 Methods applicable to research into distance education

The methods applied in distance-education research have varied. Statistical studies of student bodies seemed to dominate for a long time, but also so called qualitative studies have been made of the conditions of students (Heinze 1979 e.g.). The kind of research that implies collecting statistical data, without from the beginning relating them to a theoretical framework, used to be very common in the field of distance education and can evidently still be found. The usual design of such studies was an arrangement with two comparable groups of students made to learn the

same subject matter, one by working through a correspondence course, the other by taking part in ordinary classroom work. The achievements of the two groups were then compared. Peters refers to research of this kind as relatively advanced statistical analysis combined with a complete lack of theory (Peters 1973 p. 17). This kind of comparison illuminates a view of distance education which entirely neglects its potentials for both individual and mass education (by remaining within the traditional framework of organised classes of students), for reaching students irrespective of geographical distances and for economies of scale.

It was under the influence of positivism and behaviourism that it used to be found acceptable to collect and evaluate data without any basis in theory. This often meant an inductive approach . Awareness of the devastating criticism of inductivism delivered by Popper and his followers has made scholars more anxious than earlier to use hypothetico-deductive research methods. I have discussed these issues at some length in my books Growth and Structure of Distance Education (Holmberg 1986a pp. 104 - 107) and Theory and Practice of Distance Education (Holmberg 1989a pp. 17 - 20 and 160 - 169).

Whatever conclusions we come to in our considerations of inductive methods there can be no doubt that there is great need of fact finding about international distance education. Only with reliable factual background is it feasible to relate value judgements, traditions and practice to one another in a fruitful way. Work of this kind is being done within the framework of the United Nations University (Perry 1984), the British Open University (Raggat & Harry 1984) and the West German FernUniversität (Graff & Holmberg 1984, Holmberg 1985, Graff & Holmberg 1988 and Doerfert, Schuemer & Tomaschewski 1989). Interesting typologies of distance education occur in Schuemer 1988b and Keegan 1990.

A down-to-earth practical guide to research on distance education is Mitton 1981.

10 A discipline of distance education

What has been said so far in my view makes it reasonable to claim that a research discipline of distance education has emerged. On the basis of documented work I have elsewhere described the articulated structure of this discipline as comprising the following areas:

* Philosophy and theory of distance education
* Distant students, their milieu, conditions and study motivation
* Subject-matter presentation
* Communication and interaction between students and their supporting organisation (tutors, counsellors, administrators, other students)
* Administration and organisation

* Economics
* Systems (comparative distance education, typologies, evaluation etc.)
* History of distance education

(Holmberg 1986b p. 28)

Distance education is also taught by universities as a seperate discipline (Willmot & King 1984, Holmberg 1984 and 1986a and b). A discipline of distance education can thus by now be said to have been established both in research and university teaching.[2] Much has been achieved since the first scholarly studies of distance education were published.

2) This claim of mine has been rejected by some scholars. Cf. a debate in the Journal of Distance Education IV, 1 (Coldeway 1989a and b, Devlin 1989 and Holmberg 1989c and d).

REFERENCES

Ansere, J.K. (1978)
A profile of correspondence students in Ghana.
Epistolodidaktika 1978:2, 3 - 28

Ashhurst, J. (1985)
An evaluation of fleximode in the Victorian TAFE off-campus network in 1985.
Melbourne: Royal Melbourne Institute of Technology

Ausubel, D.P. (1968)
Educational psychology. A cognitive view.
New York: Holt, Rinehart & Winston

Bååth, J.A. (1979)
Correspondence education in the light of a number of contemporary teaching models.
Malmö: LiberHermods

Bååth, J.A. (1980)
Postal two-way communication in correspondence education.
Lund: Gleerup

Bååth, J.A. (1981)
On the nature of distance education.
Distance Education 2, 2, 212 - 219

Bååth, J.A. (1982)
Distance students' learning - empirical findings and theoretical deliberations.
Distance Education 3, 1, 6 - 27

Bååth, J.A. (1984)
Research on completion and discontinuation in distance education.
Epistolodidaktika 1984: 1 + 2, 31 - 43

Bååth, J.A. & Månsson, N.O., (1977)
CADE - a system for computer-assisted distance education.
Malmö: Hermods

Bacsich, P. (1984)
Viewdata system.
In Bates, A.W. (ed.), *The role of technology in distance education*, 173 - 184
London: Croom Helm

Barker, B.O., Frisbie, A.G. & Patrick, K.R. (1989)
Broadening the definition of distance education in the light of new telecommunication technologies.
The American Journal of Distance Education 3, 1, 20 - 29

Barker, L.J., Taylor, J.C. White, V.J., Gillard, G., Khan, A.N.,
Kaufman, D. & Mezger, R. (1986)
Student persistence in distance education: a cross-cultural multi-institutional perspective.
ICDE Bulletin 12, 17 - 36

Bartels, J. (1982)
Absolventen.
Hagen: FernUniversität, ZFE

Bartels, J. (1983)
Studienabbrecher.
Hagen: FernUniversität, ZFE

Bartels, J., Helms, F.P., Rossié, U. & Schormann, J. (1984)
Studierverhalten von Fernstudenten.
Eine vergleichende Untersuchung von Studienabbrechern und Studienfortsetzern.
Hagen: FernUniversität, ZFE

Bartels, J. & Hofmann, U. (1978)
Analyse der Studienabbrüche im Studienjahr 1976/77.
Hagen: FernUniversität, ZFE

Bartels, J. & Wurster, J. (1979)
Evaluation.
Konzepte und Erfahrungen an der FernUniversität.
2. überarbeitete Auflage.
Hagen: FernUniversität, ZFE

Bates, A.W. (ed.) (1984)
The role of technology in distance education.
London/Sydney: Croom Helm

Benkö de Rotaeche, A. (1987)
The influence of an instructional design upon learning of distance-education students in Venezuela. *ZIFF Papiere* 66.
Hagen: FernUniversität

Bibliographie Fernstudium (1966)
Karl-Marx-Stadt: Institut für Fachschulwesen der DDR

Bittner, W.S. & Mallory, H.F. (1933)
University teaching by mail.
New York: Macmillan

Boom, van den, W.J.G. & Schlusmans, K.H.L. (1989)
The didactics of open education - background, analysis and approaches. OTIC research report 9.
Heerlen: Open Universiteit, Centre for educational technological innovation

Bowles, J.C. (1987)
Fleximode - a strategy for select groups or an option for all students?
Programmed Learning and Educational Technology 24, 3, 194 - 199

Bradbury, Ph., Hinds, E., Humm, M. & Robbins, D. (1982)
Innovations in independent study at North East London Polytechnic.
In Teather, D.C.B. (ed.),Towards the community university.
Case studies of innovation and community service. 48 - 68
London: Kogan Page

Bynner, J.M. (1986)
Masters teaching in education by distance methods.
Distance Education 7, 1, 23 - 37

Casas Armengol, M. (1987)
Universidad sin clases. Educación a distancia en América Latina.
Caracas: OEA - UNA - Kapelusz

Chang, T.M., Crombag, H.F., van der Drift, K.D.J.M. & Moonen, J.M. (1983)
Distance learning. On the design of an Open University.
Boston: Kluwer-Nijhoff

Childs, G.B. (1953)
Supervised correspondence study.
4th ICCE Proceedings, 99 - 105.
University Park, P.A.: ICCE

Childs, G.B. (1960)
An annotated bibliography of correspondence study 1897 - 1960.
National University Extension Association.
New York: NUEA

Coggins, C.C. (1988)
Preferred learning styles and their impact on completion of external degree programs.
The American Journal of Distance Education 2, 1, 25 - 37

Coldeway, D.O. (1989a)
Distance education as a discipline: A debate.
Journal of Distance Education IV, 1, 54 - 55

Coldeway, D.O. (1989b)
Distance education as a discipline: A conclusion.
Journal of Distance Education IV, 1, 65 - 66

Coughlan, R. (1980)
The mentor role in individualized education at Empire State College.
Distance Education 1, 1, 1 - 12

Cunningham, J. (1987)
Openness and learning to learn.
In Hodgson, V.E., Mann, S.J. & Snell, R. (eds.), *Beyond distance teaching - towards open learning*, 40 - 58.
Milton Keynes: The Open University

Daniel, J.S. & Marquis, C. (1979)
Interaction and independence: getting the mixture right.
Teaching at a Distance 14, 29 - 44

Delling, R.M. (1966)
Versuch der Grundlegung zu einer systematischen Theorie des Fernunterrichts.
Fernunterricht 1966. Festschrift zum 50. Geburtstag von Walter Schulz-Rahe, 181 - 211.
Hamburg: Hamburger Fern-Lehrinstitut

Delling, R.M. (1975)
Distant study as an opportunity for learning.
In Ljoså, E. (ed.), *The system of distance eduation* 1, 58 - 59
Malmö: Hermods, ICCE

Delling, R.M. (1987)
Towards a theory of distance education.
ICDE Bulletin 13, 21 - 35

Devlin, L.E. (1989)
Distance education as a discipline: A response to Holmberg.
Journal of Distance Education IV, 1, 56 - 59

Dewal, O.S. (1986)
Open School, India: The preliminary years, 1979 - 1983. A case study.
Deakin Open Education Monographs No.3.
Victoria: Deakin University, The Distance Education Unit

Diehl, G.E. (1982)
Some thoughts on delayed and immediate feedback.
Alabama: The Air Force's Worldwide Campus for Professional Military Education and Specialized Skill Training, ECI

Diehl, G.E. (1989a)
Comparison of two pre-test feedback modalities on end of course test performance.
Alabama: The Air Force's Worldwide Campus for Professional Military Eduction and Specialized Skill Training, ECI

Diehl, G.E. (1989b)
The effect of field scoring on time to completion in career development courses.
Alabama: The Air Force's Worldwide Campus for Professional Military Education and Specialized Skill Training, ECI

Doerfert, F. & See-Bögehold, C. (1988)
Teaching media. In Graff, K. & Holmberg, B. (eds.), *International study on distance education*, 47 - 54.
Hagen: FernUniversität, ZIFF

Doerfert, F., Schuemer, R., Tomaschewski, C. (eds.),
co-editors: Bückmann, B., Bückmann, N. & See-Bögehold, C. (1989)
Short descriptions of selected distance-education institutions.
Hagen: FernUniversität, ZIFF

Dohmen, G. (1967)
Das Fernstudium. Ein neues pädagogisches Forschungs- und Entwicklungsfeld.
Heidelberg: Quelle & Meyer

Elton, L.R.B., Oliver, E. & Wray, M. (1986)
Academic staff training at a distance - a case study.
Programmed Learning and Educational Technology 23, 1, 29 - 40

Erdos, R.F. (1967)
Teaching by correspondence. Unesco source book.
London: Longman

Erdos, R.F. (1975)
The system of distance education in terms of sub-systems and characteristic functions.
In Ljoså, E. (ed.), *The system of distance education*, 9 - 19. Malmö: Hermods

Evans, T.D. & Nation, D.E. (1989)
Critical reflections on distance education.
London: Falmer Press

Feig, C.A. (1932)
The effectiveness of correspondence study as compared with campus study in teacher training.
University Park: Pennsylvania State College (mim.)

Fitzpatrick, J. (1982)
The Australian schools of the air: the conundrum of who teaches.
Distance Eduation 3, 2, 183 - 197

Flinck, R. (1978)
Correspondence education combined with systematic telephone tutoring.
Kristianstad: Hermods

Flinck, R. (1980)
The research project on two-way communication in distance education: an overview.
Epistolodidaktika 1980:1-2, 3 - 10

Foks, J. (1987)
Towards open learning.
In Smith, P. & Kelly, M. (eds.), *Distance education and the mainstream,* 74 - 92.
London: Croom Helm

Forsythe, K. (1986)
Understanding the effectiveness of media in the learning process.
Paper presented at the World Congress on Education & Technology in Vancouver,May 1986.
Victoria: Learning Systems Knowledge Network

Fox, S. (1989)
The production and distribution of knowledge through open and distance learning.
Educational & Training Technology International 26, 3, 269 - 280

Garrison, D.R. (1989)
Understanding distance education. A framework for the future.
London and New York: Routledge

Garrison, D.R. & Shale, D.G. (1987)
Mapping the boundaries of distance education: problems in defining the field.
The American Journal of Distance Education 1, 1, 7 - 13

Glatter, R. & Wedell, E.G. (1971)
Study by correspondence. An enquiry into correspondence study for examinations for degrees and other advanced qualifications.
London: Longman

Göttert, R. (1983)
Fernstudieninteressenten. Ihr Selbstbild und weiterer Studienverlauf. *ZIFF Papiere* 47.
Hagen: FernUniversität

Graff, K. & Holmberg, B. (eds.) (1984)
Fernstudium im internationalen Vergleich - Erste Ergebnisse.
Hagen: FernUniversität, ZIFF

Graff, K. & Holmberg, B. (eds.) (1988)
International study on distance education: a project report.
Hagen: FernUniversität, ZIFF

Hall, W., Thorogood, P., Hutchings, G. & Carr, L. (1989)
Using hypercard and interactive video in education: an application in cell biology.
Educational and Training Technology International 26, 3, 207 - 214

Harris, D. (1987)
Openness and closure in distance education.
London, New York and Philadelphia: The Falmer Press

Hawkridge, D. & McCormick, B. (1983)
China's Television Universities.
British Journal of Educational Technology 3, 14, 160 - 173

Heinze, Th. (1979)
Lebensweltanalyse von Fernstudenten: Theoretische und methodische Überlegungen zum Typus hermeneutisch-lebensgeschichtliche Forschung.
Hagen: FernUniversität, ZIFF

Henderson, E.S. & Nathenson, M.B. (1976)
Developmental testing: an empirical approach to course improvement.
Programmed Learning & Educational Technology 13, 4, 31 - 42

Henri, F. & Kaye, A. (1985)
Le savoir à domicile. Pédagogie et problématique de la formation à distance.
Québec: Presses de l'Université du Québec, Télé-université

Hinds, E. (1987)
The school for independent study and international links.
ZIFF PAPIERE 69.
Hagen: FernUniversität

Holmberg, B. (1960)
On the methods of teaching by correspondence.
Lunds universitets årsskrift N.F.Avd. 1 Bd. 54 Nr. 2.
Lund: Gleerup

Holmberg, B. (1967)
Correspondence education. A survey of applications, methods and problems.
Malmö: Hermods

Holmberg, B. (1968)
Studies in education by correspondence. A bibliography.
Malmö: Hermods, CEC

Holmberg, B. (1973)
Supervised correspondence study - a Swedish case study based on experiences within the school system.
Epistolodidaktika 1973:2, 29 - 34

Holmberg, B. (1977)
Distance education: a survey and bibliography.
London: Kogan Page

Holmberg, B. (1983)
Organizational models for course development.
Epistolodidaktika 1983:2, 14 - 27

Holmberg, B. (1984)
Professional development courses in distance education: a reply.
Distance Education 5, 2, 237 - 238

Holmberg, B. (1985)
On the status of distance education in the world in the 1980s - a preliminary report on the FernUniversität comparative study.
Epistolodidaktika 1985:1, 63 - 93

Holmberg, B. (1986a)
Growth and structure of distance education.
Beckenham: Croom Helm

Holmberg, B. (1986b)
A discipline of distance education.
Journal of Distance Education 1, 1, 25 - 40

Holmberg, B. (1989a)
Theory and practice of distance education.
London and New York: Routledge

Holmberg, B. (1989b)
The concepts and applications of distance education and open learning.
International Journal of Innovative Higher Education 6, 1 and 2, 24 - 28

Holmberg, B. (1989c)
Terminology and epistemology: A comment on Devlin's analysis of distance education as a discipline.
Journal of Distance Education IV, 1, 60 - 61

Holmberg, B. (1989d)
Further to the question of whether distance education is a discipline.
Journal of Distance Education IV, 1, 62 - 64

Holmberg, B. (ed.) (1989e)
Mediated communication as a component of distance education.
Hagen: FernUniversität, ZIFF

Holmberg, B. (1989f)
The concept, basic character and development potentials of distance education.
Distance Education 10, 1, 127 - 134 and 160

Holmberg, B. (1990)
On the rationale, typology and methodology of research and scholarship.
Hagen: FernUniversität, ZIFF

Holmberg, B., Schuemer, R. & Obermeier, A. (1982)
Zur Effizienz des gelenkten didaktischen Gespräches.
ZIFF-Projekt 2.6, Schlußbericht mit einer englischen Zusammenfassung (with an English summary).
Hagen: FernUniversität, ZIFF

Holmberg, B. & Schuemer, R. (1988)
Zur Wirkung der Dichte und des Umfangs von Einsendeaufgaben - Abschlußbericht zum ZIFF Projekt 2.33.
Hagen: FernUniversität

Holmberg, B. & Schuemer, R. (1989)
Tutoring frequency in distance education. ACSDE Research Monograph No. 1.
University Park, P.A.: The American Center for the Study of Distance Education, The Pennsylvania State University

Howard, D.C. (1985)
Reading and study skills and the distance learner.
Distance Education 6, 2, 169 - 188

Howard, D.C. (1987)
Designing learner feedback in distance education.
The American Journal of Distance Education 1, 3, 24 - 40

Inglis, P. (1988)
Independent learning: What the students say. In Sewart, D. & Daniel, J.S. (eds.), *Developing distance education*, 249 - 256
Oslo: ICDE

Jevons, F. (1984)
Distance education in mixed institutions: working towards parity.
Distance Education 5, 1, 24 - 37

Jones, A. (1984)
Computer assisted learning in distance education.
In Bates, A.W. (ed.), *The role of technology in distance education*.
London: Croom Helm

Juler, Ph. (1989)
Promoting interaction: maintaining independence.
Swallowing the mixture?
In Tait, A. (ed.), *Interaction and independence, Conference papers*, 135 - 141
Cambridge: Open University East Anglia

Kaufman, D. (1982)
Course development: industrial or social process.
Paper presented at the American Educational Research Association.
New York City

Kaye, A. & Rumble, G. (eds.) (1981)
Distance teaching for higher and adult education.
London: Croom Helm in association with The Open University Press

Keegan, D.J. (1980)
Drop-outs at The Open University.
The Australian Journal of Education 24, 1, 44 - 55

Keegan, D.J. (1990)
Foundations of distance education.
London and New York: Routledge

Kemmis, S. (1980)
Program evaluation in distance education: against the technologisation of reason.
Open Campus 2, 19 - 48

Köymen, U.S. (1983)
A model for organizing written instructional material in the context of a proposed model for an open university in Turkey. (Doctoral dissertation).
Syracuse, N.Y.: Syracuse University

Laaser, W. (1988)
Some obstacles to implement new information technologies in distance education. In Sewart, D. & Daniel, J.S. (eds.), *Developing distance education*.
Oslo: ICDE

Lampikoski, K. (1984)
Boosts from computers in distance education.
Epistolodidaktika 1984:1&2, 58 - 73

Lehner, H. & Weingartz, M. (1981)
Ready-made and individualised distance study.
ICCE-Newsletter 11, 1, 7 - 10

Lehner, H. & Weingartz, M. (1985)
Konfektionierung und Individualisierung im Fernstudium.
ZIFF Papiere 58.
Hagen: FernUniversität

Ljoså, E. (1975)
The system of distance education.
Malmö: Hermods, ICCE

Ljoså, E. (1988)
The boundaries of distance education.
Journal of Distance Education 3, 1, 85 - 88

Ljoså, E & Sandvold, K.E. (1976)
The students' freedom of choice within the didactical structure of a correspondence course. In Sewart, D., Keegan, D. & Holmberg, B. (eds.), *Distance education. International perspectives*, 291 - 315 (also published in Epistolodidaktika 1983:1, 34 - 62).
London: Croom Helm

Macdonald-Ross, M. (1973)
Behavioural objectives - a criticial review.
Instructional Science 2, 1 - 52

Macdonald-Ross, M. (1977)
Graphics in text. In Shulman, L.S. (ed.), *Review of research in education* 5.
Itasca III: Peacock

Macdonald-Ross, M. (1979)
Language in texts: a review of research relevant to the design of curricular materials. In Shulman, L.S. (ed.), *Review of research in education* 6.
Itasca, Ill.: Peacock

Marshall, L. & et al. (1984)
Independent study contracts. A guide for students considering applying for independent study contracts and for staff who supervise them. 2nd edition.
Murdoch: Murdoch University

Marton, F. (1975)
What does it take to learn? In Entwistle, N. & Hounsell, D. (eds.), *How students learn. Readings in Higher Education* 1, 125 - 138.
Lancaster: University of Lancaster, Institute for Research and Development in Post-Compulsory Education

Marton, F. (1979)
Learning as seen from the learners' point of view. *ZIFF Papiere* 30.
Hagen: FernUniversität

Marton, F. (1983)
Beyond individual differences.
Hagen: FernUniversität, ZIFF

Marton, F. & Säljö, R. (1976)
On qualitative differences in learning.
British Journal of Educational Psychology 46, 115 - 127

Mason, R. & Kaye, A. (eds.) (1989)
Mindweave. Communication, computers and distance education.
Oxford: Pergamon

Masson, J. (1987)
La clientèle étudiante et les institutions de formation à distance.
Journal of Distance Education 2, 2, 56 - 64

McGuire, A. (1973)
Australia's school of the air.
ICCE Newsletter 3, 3, 4 - 6

McIntosh, N., Calder, J. & Swift, B. (1976)
A degree of difference. A study of the first year's intake to the Open University of the United Kingdom.
Guildford: Society for Research into Higher Education

McIntosh, N., Woodley, A. & Morrison, V. (1980)
Student demand and progress at the Open University - the first eight years.
Distance Education 1, 1, 37 - 60

Milanesi, S. Bigues de (1978)
ULSA trains its students "in-company" in 22 countries. In Wentworth, R.B. (ed.), *Correspondence education: dynamic and diversified I.* ICDE (11th World Conference)
London: Tuition House

Minnis, J.R. (1985)
Ethnography, case study, grounded theory, and distance education research.
Distance Education 6, 2, 189- 198

Mitchell, S. (1962)
Supervised correspondence study for high schools and for adults taking high school courses.
The Home Study Review, Spring 1962

Mitton, R. (1981)
Practical research in distance teaching.
Cambridge: International Extension College

Moore, M.G. (1972)
Learner autonomy: the second dimension of independent learning.
Convergence 5, 2, 76 - 88

Moore, M.G. (1973)
Towards a theory of independent learning.
Journal of Higher Education, 44, 661 - 679

Moore, M.G. (1977)
On a theory of independent study. *ZIFF Papiere* 16.
Hagen: FernUniversität

O'Shea, T. (1984)
Computer assisted learning in distance education. *Finn Spring Workshop 1984.* A collection of conference documents.
Also published in *Epistolodidaktika* 1984:1&2, 44 - 57.
Helsinki: EHSC / Markkinionti Instituuti

Paine, N. (ed.) (1988)
Open learning in transition. An agenda for action.
London: Kogan Page

Pask, G. (1976a)
Conversational techniques in the study and practice of education.
British Journal of Educational Psychology 46, 12 - 25

Pask, G. (1976b)
Styles and strategies of learning.
British Journal of Educational Psychology 46, 126 - 148

Perraton, H. (1981)
A theory for distance education.
Prospects XI, 1, 13 - 24

Perraton, H. (1982)
The cost of distance education.
IEC broadsheets on distance learning 17
Cambridge: International Extension College

Perraton, H. (1987)
Theories, generalisation and practice in distance education.
Open Learning 2, 3, 3 - 12

Perry, W. (1984)
The state of distance learning worldwide: the first report on the index of institutions involved in distance learning.
Milton Keynes: United Nations University, Centre for Distance Learning

Peters, O. (1965)
Der Fernunterricht. Materialien zur Diskussion einer neuen Unterrichtsform.
Weinheim: Beltz

Peters, O. (1967)
Das Fernstudium an Universitäten und Hochschulen. Didaktische Struktur und vergleichende Interpretation: ein Beitrag zur Theorie der Fernlehre.
Weinheim: Beltz

Peters, O. (1973)
Die didaktische Struktur des Fernunterrichts. Untersuchungen zu einer industrialisierten Form des Lehrens und Lernens.
Tübinger Beiträge zum Fernstudium 7.
Weinheim: Beltz

Peters, O. (1983)
Distance teaching and industrial production: a comparative interpretation in outline. In Sewart, D., Keegan, D. & Holmberg, B. (eds.), *Distance education. International Perspectives*, 95 - 113.
London: Croom Helm

Peters, O. (1988)
Anmerkungen zum Studienabbruch. *ZIFF Papiere* 73.
Hagen: FernUniversität

Peters, O. (1989)
The iceberg has not melted: further reflections on the concept of industrialisation and distance teaching.
Open Learning, November 1989, 3 - 8

Plessis, P. du (1987)
Can the tables be turned? Likelyhood that distance teaching at university can be more effective than attendance teaching. In *Papers* 1, 9 - 18.
Pretoria: University of South Africa

Popper, K. (1972)
Naturgesetze und theoretische Systeme. In Albert, H. (ed.), *Theorie und Realität*.
Tübingen: Mohr

Popper,K. (1980)
The logic of scientific discovery.
London: Hutchinson

Raggatt, P. & Harry, K. (1984)
Trends in distance higher education I - II.
Milton Keynes: The Open University

Rayner, S.A. (1949)
Correspondence education in Australia and New Zealand.
Melbourne: Melbourne University Press

Rekkedal, T. (1972)
Correspondence studies - recruitment, achievement and discontinuation.
Epistolodidaktika 1972:2, 3 - 38

Rekkedal, T. (1978)
Research and development activities in the field of distance study at NKI-skolen, Norway.
Epistolodidaktika 1978:2, 29 - 38

Rekkedal, T. (1983)
The written assignments in correspondence education. Effects of reducing turn-around time. An experimental study. (A translation of 'Innsendingsoppgavene i brevundervisningen' of 1973)
Distance Education 4, 2, 231 - 252

Rekkedal, T. (1985)
Introducing the personal tutor/counsellor in the system of distance education. Project report 2: Final report.
Oslo: NKI

Robinson, B. (1984)
Telephone teaching. In Bates, A.W. (ed.), *The role of technology in distance education*, 121 - 137
London: Croom Helm

Rosberg, U. (1966)
How should the most efficient correspondence course be designed?
The Home Study Review 7, 4, 17 - 19

Rothkopf, E.Z. (1966)
Learning from written instructive materials: an exploration of the control of inspection behaviour by test-like events.
American Educational Research Journal 3, 241 - 249

Rothkopf, E.Z. (1970)
The concept of mathemagenic activities.
Review of Educational Research 40, 325 - 336

Rumble, G. (1981)
Evaluating autonomous multi-media distance learning systems: a practical approach.
Distance Education 2, 1, 64 - 90

Rumble, G. (1986)
The planning and management of distance education.
Beckenham: Croom Helm

Rumble, G. (1989a)
'Open Learning', 'distance learning'and the misuse of language.
Open Learning 4, 2, 32 - 40

Rumble, G. (1989b)
On defining distance education.
The American Journal of Distance Education 3, 2, 8 - 21

Saxe, B. (1965)
The principles and methods of supervised correspondence study as applied in military educational programmes.
CEC Yearbook 1965, 32 - 39.
Leiden: CEC

Schuemer, R. (1988a)
Two-way communication: tutoring, counselling and assessment. In Graff, K. & Holmberg, B. (eds.), *International study on distance education*, 55 - 82.
Hagen: FernUniversität, ZIFF

Schuemer, R. (1988b)
Internationale Studie zum Fernstudium. Ergänzungsbericht - Versuch zur Klassifikation der Institutionen auf empirischer Basis.
Hagen: FernUniversität, ZIFF

Scriven, B. (1988)
The use of electronic mail in distance education. In Sewart, D. & Daniel, J.S. (eds.), *Developing distance education*, 391 - 395
Oslo: ICDE

Scriven, M. (1967)
The methodology of evaluation. In Tyler, R.W., Gagné, R.M. & Scriven, M. (eds.), *Perspectives of curriculum evaluation. AERA monograph. Series on curriculum evaluation* 1, 39 - 83.
Chicago: Rand McNally

Sewart, D. (1981)
Distance teaching: a contradiction in terms?
Teaching at a Distance 19, 8 - 18

Sewart, D. (1983)
Students and their progress. In Sewart, D., Keegan, D. & Holmberg, B. (eds.), *Distance education - International perspectives*, 165 - 169.
London: Croom Helm

Sewart, D. (1984)
Counselling in distance education - an overview. *International workshop on counselling in distance education. Selected papers*, 7 - 11, ICDE.
Manchester: The Open University

Shale, D. (1988)
Towards a reconceptualization of distance education.
The American Journal of Distance Education 2, 3, 25 - 35

Shale, D. (1989)
Foreword to Garrison 1989 - see above

Sims, R.S. (1966)
The search for purpose in correspondence education. *The Brandenburg memorial essays on correspondence instruction II*, 74 - 88
Madison: The University of Wisconsin

Smith, K.C. (1983)
Putting the student first: some personal perspectives or a tale of two serpents. In Daniel, J.S., Stroud, M.A. & Thompson, J.R. (eds.), *International Council for Distance Education. 1982 conference report and handbook*, 12 - 21
Edmonton: Athabasca University/ICDE

Smith. P. & Kelly, M. (eds.) (1987)
Distance education and the mainstream. Convergence in education.
London: Croom Helm

Snowden, B.L. & Daniel, J.S. (1980)
The economics and management of small post-secondary distance education systems.
Distance Education 1, 1, 68 - 91

Sommer, K.H. (1965)
Der Fernunterricht, seine Wirklichkeit und Problematik unter besonderer Berücksichtigung des berufsbezogenen 'Briefunterrichts' in der Bundesrepublik Deutschland.
Laasphe: Adalbert Carl

Staaf, P. (1973)
Utvackling av en utbildningsmodell. Analys, planering, konstruktion, uppföljning.
Stockholm: Landstingsförbundet

Stake, R. (1977)
Formative and summative evaluation. In Hamilton, D., Jenkins, D., King, C., MacDonald, B. & Parlett, M. (eds.), *Beyond the numbers game. A reader in educational evaluation*.
London: Macmillan

Taylor, P. & Tomlinson, D. (1985)
Primary distance education. Population, problems and prospects. *Research Series* No. 2
Nedlands, W.A.: The National Centre for Research on Rural Education, University of Western Australia

Tesarowski, C. (1984)
Correspondence instruction and the school.
ICDE Bulletin 4, 13 - 16

Thomas, L.F. & Harri-Augstein, E.S. (1977)
Learning to learn: The personal construction and exchange of meaning. In Howe, M.J.A. (ed.), *Adult learning. Psychological research and applications*.
London: Wiley

Thompson, D. & Castro, F. (1988)
Assignment turn-around time - perceptions and processes. In Sewart, D. & Daniel, J.S. (eds.), *Developing distance education*, 422 - 425.
Oslo: ICDE

Thornton, R. & Mitchell, J. (1978)
Counselling the distance learner: a survey of trends and literature.
Adelaide: Adelaide College of Advanced Education

Thorpe, M. (1987)
Conference report: Association of European Correspondence Schools (AECS) autumn congress 1986 in Munich.
Open Learning 2, 2, 56

Thorpe, M. (1988)
Evaluating open and distance learning.
Harlow: Longman

Tight, M. (1987)
London University external developments.
Open Learning 2, 2, 49 - 51

Tomlinson, D., Coulter, F. & Peacock, J. (1985)
Teaching and learning at home: Distance education and the isolated child.
Research Series No. 4, National Centre for Research on Rural Education
Nedlands: The University of Western Australia

Vivian, V. (1986)
Electronic mail in a children's distance course: trial and evaluation
Distance Education 7, 2, 237 - 260

Wagner, L. (1977)
The economics of The Open University revisited.
Higher Education 6, 3, 359 - 381

Waller, R. (1980)
Notes on transforming nos. 4 and 5. In Hartley, J. (ed.),
The psychology of written communication, 145 - 159.
London: Kogan Page

Wångdahl, A. (1980)
Who are the correspondence students and what about their handicap of isolation?
Pedagogical Reports 130
Lund: Lund University, Dep. of Education

Wedemeyer, C.A. (1965)
Correspondence education in the world of today. A general survey of the field, ideas, principles, trends.
7th ICCE Proceedings, 8 - 18
Stockholm: ICCE

Wedemeyer, C.A. (1981)
Learning at the back door. Reflections on non-traditional learning in the lifespan.
Madison: University of Wisconsin

Wedemeyer, C.A. & Childs, G.B. (1961)
New perspectives in university correspondence study.
Chicago: Center for Study of Liberal Education for Adults

Weingartz, M. (1980)
Didaktische Merkmale selbstinstruierender Studientexte.
Hagen: FernUniversität, ZIFF

Weingartz, M. (1981)
Lernen mit Texten.
Bochum: Kamp

Weingartz, M. (1988)
Learning and teaching. In Graff, K. & Holmberg, B. (eds.),
International study on distance education: a project report,
35 - 46.
Hagen: FernUniversität, ZIFF

Weingartz, M. (1990)
Selbständigkeit im Fernstudium.
Hagen: FernUniversität, ZIFF

Weissbrot, E. (1969)
Specific aspects of supervised correspondence study with school children. *8th ICCE Proceedings*, 163 - 177

Willmott, G. & King, B. (1984)
Professional development courses in distance education.
Distance Education 5, 1, 116 - 130

Winders, R. (1988)
Information technology in the delivery of distance education and training.
Soham Ely, Cambs.: Peter Francis Publishers

Winter, A. & Cameron, M. (1983)
External students and their libraries.
Geelong: Deakin University

Woodley, A. (1986)
Correspondence schoolchildren in Alaska.
Open Learning 1, 3, 47 - 49

Worth, V. (1982)
Empire State College/State University of New York Center for Distance Learning.
DERG Papers 7.
Milton Keynes: The Open University

Xie, X. (1989)
The first decade of China's tertiary radio and television education. A conference document.
Beijing: Central Radio and TV University

Zhao, Y. (1988)
China: its distance higher-education system.
Prospects XVIII, 2, 217 - 228